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FEBRUARY 4, 1955

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FRUIT INSECTS SECTION

Cooperative ECONOMIC INSECT REPORT

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UNITED STATES DEPARTMENT OF AGRICULTURE

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ECONOMIC INSECT SURVEY SECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Branch serves as a clearing house and does not assume responsibility for accuracy of the material.

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Economic Insect Survey Section
Plant Pest Control Branch
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Volume 5 February 4, 1955 No. 5

COOPERATIVE ECONOMIC INSECT REPORT

Highlights of Insect Conditions

Survey for GREENBUG and other grain APHIDS in central and southern Great Plains in late 1954. (page 89).

Summary of BOLL WEEVIL hibernation counts -- 1951-54. (page 91).

Summary of INSECT CONDITIONS - 1954 - in Massachusetts (page 94) and Washington (page 95).

ARMYWORM outbreaks in the United States-1954. (Summary of special questionnaire) (page 99).

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Reports in this issue are for the week ending January 28, 1955, unless otherwise designated.

WEATHER BUREAU'S 30-DAY OUTLOOK
*February 1955

The Weather Bureau's 30-day outlook for February calls for temperatures to average below seasonal normals over the eastern half of the nation with greatest departures over the Ohio Valley. Above normal temperatures are expected to prevail in the Pacific Northwest and Far Southwest. Otherwise near normal values are indicated. Precipitation, much of it in the form of snow, is expected to exceed normal in states along the Atlantic and Gulf Coasts. Subnormal amounts are predicted in the Midwest and the Pacific Northwest. In areas not specified near normal amounts are in prospect.

*This report released by the Weather Bureau on February 1, 1955

Weather forecast given here is based on the official 30-day "Resume and outlook," published twice a month by the Weather Bureau. You can subscribe through Superintendent of Documents, Washington, D. C. Price: $4.80 a year, $2.40 for six months.

WEATHER FOR THE WEEK ENDING JANUARY 31, 1955

The weather of the past week was unusually cold and dry in most sections of the Country. In the eastern half of the Nation persistent cold with the lowest temperatures of the winter to date resulted in weekly averages ranging down to 17° below normal. In the far West temperatures were a little higher last week than during the previous week, but still averaged well below normal except along the Canadian and Mexican Borders where they were slightly above normal. There was no precipitation in the lower Great Plains, the far Southwest, and in scattered sections along the Atlantic Coast, and only very light amounts in most of the remainder of the Country. Weekly totals of one-half inch or more were limited mainly to scattered localities in the upper Great Lakes, along the Atlantic and Pacific Coasts, and to Florida. In the latter area 1 to over 2 inches fell over most of the Peninsula. In the eastern half of the Country subzero minima, occurring on several days in northern sections, extended southward to the central Great Plains and the Ohio Valley on the 27th. On the 28th Oakland, Md., in the western part of that State, reported a minimum of -26°, the lowest there since January 29, 1925 when -31° occurred.

Freezing occurred over most of Texas on the 24th and 25th when frost in the lower Rio Grande Valley killed young watermelon plants in the vicinity of Falfurrias and caused light, scattered damage to other tender plants. Near freezing and heavy frost

(Weather continued on page 93).

CEREAL AND FORAGE INSECTS

Survey of the Central and Southern Great Plains Region For Greenbugs and Other Aphids Attacking Small Grains

At the Small Grain Insect Workers' Conference held at Denton, Texas, November 3 and 4, 1954, it was decided that periodic cooperative surveys should be made to determine greenbug population levels throughout the Great Plains region of the hard red winter wheat area. These surveys were to be made at monthly intervals during the greenbug season and the reports sent to the Small Grain Insects Investigations Project headquarters at Stillwater, Oklahoma, for compilation and distribution. The purposes of these surveys are to obtain advance information on potential outbreaks, and to further our knowledge as to the long distance movements of this pest. This first compilation covers the period October 27 to December 20, 1954.

A summary of conditions during this period follows: Light infestations of GREENBUG were found throughout most of the central and southern Great Plains area. Populations in southwestern Nebraska, northeastern Colorado, western Kansas, the Oklahoma Panhandle, and west-central Oklahoma were extremely low, with only an occasional greenbug observed. No greenbugs were found in north-central, central, and south Texas. Light infestations of 5 to 10 greenbugs or less per linear foot occurred in dryland wheat in the Texas Panhandle, with heavier populations in some irrigated fields in Swisher County. Predators, especially nabids, were generally distributed throughout the area and were numerous in certain localities, especially near Hereford. Few coccinellids and no parasitic wasps were observed. Light infestations of ENGLISH GRAIN APHID on wheat were found in southwestern Nebraska and western Kansas, with populations decreasing to extremely low levels southward. Several fields of barley in central-western Kansas had moderately heavy infestations of CORN LEAF APHID. APPLE GRAIN APHIDS and corn leaf aphids occurred in extremely low numbers on wheat in most areas, but were very numerous in a few fields in western Moore County of the Texas Panhandle. Apple grain aphids were also numerous in some fields in Ochiltree County, Texas. (Small Gr. Ins. Regional Cooperators).

GRASSHOPPERS AND MORMON CRICKET - UTAH - Grasshopper damage in Utah during 1954, both crop and range, is estimated at $981, 700. Crop and range savings from rather extensive grasshopper and Mormom cricket control programs are estimated at $1, 189, 500. (Thornley, Knowlton).

YELLOW CLOVER APHID (*Myzocallis trifolii*) - ARIZONA - Slight decrease in populations at Yuma, but aphids are still plentiful. Light populations at Bowie, continuing from a general light infestation this winter. (Ariz. Coop. Rept.).

COWPEA APHID (*Aphis medicaginis*) - LOUISIANA - Very damaging infestation on common vetch in Red River Valley. Infestation is general, but confined to common vetch. (Newsom).

CLOVER MITE (*Bryobia praetiosa*) - ARIZONA - Beginning to appear on Yuma Mesa, mostly on Ranger alfalfa. (Ariz. Coop. Rept.).

GREENBUG (*Toxoptera graminum*) - TEXAS - Light infestation on wheat in Castro County. Five to 10 per linear foot with low beneficial insect ratio. Heavy infestation on wheat in Swisher County; 70 to 100 per linear foot found with low beneficial insect ratio. (Simonds).

A WINTER GRAIN MITE (*Penthaleus major*) - TEXAS - Light to medium infestation on small grain throughout Parker County. (Denton).

FRUIT INSECTS

MEXICAN FRUIT FLY (*Anastrepha ludens*) - TEXAS - One gravid female was found in a trap in the McAllen district, Rio Grande Valley area, on January 10. May have egg laying and larval infestations within the next 30 days. (Mex. Fruit Fly and Citrus Blackfly Cont. Proj.).

CALIFORNIA RED SCALE (*Aonidiella aurantii*) - ARIZONA - Severe local infestation in northeast section of Phoenix, mainly on euonymus, citrus and oleander. (Ariz. Coop. Rept.).

CORRECTION: CHERRY FRUIT SAWFLY (*Hoplocampa cookei*) was erroneously listed for PEAR-SLUG (*Caliroa cerasi*) in CEIR 4(27): 599, 1954. (Roth).

TRUCK CROP INSECTS

VEGETABLE WEEVIL (*Listroderes costirostris obliquus*) - ARIZONA - In a garden planting of celery at Phoenix. (Ariz. Coop. Rept.).

SWEETPOTATO WEEVIL (Cylas formicarius elegantulus) - IOWA - Two specimens found in sweetpotatoes in a home in Decatur, Decatur County. Potatoes were purchased locally but no further beetles found in food markets in the town. Examination is being made of food markets in other towns to ascertain if infested potatoes may be moving interstate into Iowa. (Harris). This note should not be construed to mean that there is an established infestation of this weevil in Iowa, but rather that it has been collected as an interception.

A SUBTERRANEAN APHID (Rhopalosiphum subterraneum) - FLORIDA - Nymphs and adults infesting roots of squash at Bradenton. (Kelsheimer).

COTTON INSECTS

Summary of Boll Weevil Hibernation Counts--1951-54:

This table shows the average number of live boll weevils found per acre in fall examinations of surface woods trash during the past four years. The counts for South Carolina were taken in Florence County, those in Tennessee in McNairy County and those in Louisiana in Madison Parish. Fall hibernation counts are not available for Virginia and North Carolina prior to 1954. These data have been compiled from recent reports and ARS records.

State	1954	1953	1952	1951
Virginia	2,033	-	-	-
North Carolina	1,334	-	-	-
South Carolina	2,299	3,533	6,259	1,573
Georgia	99	1,984	1,346	852
Tennessee	311	31	2,259	239
Louisiana	2,686	5,239	1,295	1,367

FOREST, ORNAMENTAL AND SHADE TREE INSECTS

RED-HEADED PINE SAWFLY (Neodiprion lecontei) - FLORIDA - Larvae feeding on needles of longleaf pine seedlings at Orlando. (Martin).

CORRECTION: The cynipid, Andricus chrysolepidicola var. garryanae, in CEIR 3(30): 563, 1953, was misidentified. The correct species is Bassettia ligni Kinsey. (Roth).

INSECTS AFFECTING MAN AND ANIMALS

TROPICAL RAT MITE (Bdellonyssus bacoti) - IOWA - Individuals in a neighborhood bothered by bites of this mite. Examination of the premises disclosed that the mites came from an old home in which the occupants had noticed noises in the walls, presumably caused by rats. (Harris).

CATTLE LICE - UTAH - Are a problem in many livestock herds throughout the State. (Knowlton).

A FRUIT FLY (Drosophila repleta) - GEORGIA - Heavy infestations in many restaurants in Atlanta and several in La Grange, January 20. (Jordan).

STORED-PRODUCT INSECTS

A FUNGUS BEETLE (Alphitophagus bifasciatus) - MARYLAND - In grain at Beltsville. (U. Md., Ent. Dept.).

A GRAIN WEEVIL - UTAH - At Lehi 1,100 bushels of wheat infested. (Boswell, Knowlton).

MISCELLANEOUS INSECTS

BOXELDER BUG (Leptocoris trivittatus) - UTAH - Caused some annoyance in homes and offices during warmer winter days. (Knowlton).

STONEFLIES - RHODE ISLAND - Adults settling in great numbers on stone walk near house. (Mathewson, Jan. 11).

RECENT IMPORTANT INTERCEPTIONS AT PORTS OF ENTRY

A living pupa of Omphisa anastomosalis (Guen.), the sweetpotato stem borer, was intercepted in a sweetpotato in cargo from India at Boston, Massachusetts. (Crump). The infested sweetpotato was part of a shipment carried as food for animals being shipped to the United States. This insect is considered a serious pest of sweetpotatoes in Hawaii and parts of the Indo-Malayan Region. Injury is due to the larvae boring in the stems of the plant causing them to wilt, die and decay. The borers at times tunnel into the roots of the sweetpotato to cause more serious damage. Other garden crops have been attacked. According to observations on the life history of the insect in Hawaii, the eggs are laid singly or in groups of 2 or 3 in crevices in the stems and on the leaves. The young larvae soon after hatching bore into the stem and tunnel downward. Pupation usually occurs in the larval burrow in the stem or root. The sweetpotato stem borer has been reported from China, India, Ceylon, Japan, Java, Burma and Hawaii. It has been intercepted occasionally in sweetpotatoes in baggage, stores and in animal food from China at West Coast ports and Hawaii. It is not known to occur in the continental United States. (Compiled - Plant Quarantine Branch).

Weather Continued

occurred on the coasts of Louisiana, Mississippi, and Alabama both at the beginning and end of the week. Frost also occurred in southern sections of Florida on the 25th, 26th, and 28th, causing some damage to tender crops. This is the third consecutive week of unusually cold weather with frequent frosts in Florida, and although resulting crop damage in any one week has not been serious, the cumulative effects of these frequent frost are reported to have become significantly large. Growth of grains, pastures, and early crops were retarded throughout the South.

Drought continued to plague the western portions of the Lower Great Plains. In the South and Southeast, however, where droughty conditions were broken only recently, moisture remained ample and in parts of the lower Mississippi Valley the soil is too wet to work. Snowfall was frequent but generally light in the northeastern quarter of the Country, and depths of the snow cover in that area were slightly increased. Depths in the Appalachians now range from 8 to 15 inches in western Maryland, up to 25 inches at Canaan Valley in West Virginia, and up to 49 inches at Caribou in northern Maine. In central areas, the southern limit of the snowline runs through southern Ohio, central portions of Indiana and Illinois, extreme northern Missouri, and thence northwestward to northeastern Montana, with depths generally ranging from 2 to 5 inches except in northern portions of Minnesota, Wisconsin, and Michigan where some stations report 20 inches or more. The ground is generally bare in the western portion of the Great Plains. Little snow fell in the far West where the mountain snowpack remained mostly unchanged, and the Great Basin remained covered with 2 to 6 inches of snow as far south as central Utah and Nevada. (Summary Supplied by U. S. Weather Bureau).

SUMMARY OF INSECT CONDITIONS-1954

MASSACHUSETTS

Reported by A. I. Bourne, E. H. Wheeler,
W. B. Becker, F. R. Shaw, and
W. D. Whitcomb

Vegetable Pests

CABBAGE MAGGOT (*Hylemya brassicae*) flies observed last week of April in lower Connecticut River Valley and Plymouth County. First brood damage about normal. Second brood heavier in some areas than usual. Cool wet season apparently favored the pest. CABBAGEWORMS were generally abundant. WIREWORMS were more troublesome than usual, especially in early season. Most tobacco and potato growers practiced soil treatment. 20 to 30 percent loss in a two-acre field of seed onions. Early in season wireworms and SEED-CORN MAGGOT injured corn fields so badly replanting was necessary. SPINACH LEAF MINER (*Pegomya hyoscyami*) was a serious pest throughout the entire summer. ASPARAGUS BEETLES were generally abundant. FLEA BEETLES were normal in abundance. APHIDS were normally abundant generally - very abundant locally. EUROPEAN CORN BORER (*Pyrausta nubilalis*) about on schedule in moth emergence and egg laying . First brood about normal. Late attack delayed somewhat and slightly lighter than normal. Pupae found in late August. POTATO BEETLES (*Lema trilineata* and *Leptinotarsa decemlineata*) were plentiful in plantings on Cape Cod June 18. Not very abundant elsewhere. MEXICAN BEAN BEETLE (*Epilachna varivestis*) was not as abundant as usual. Cool wet weather seems to have slowed activity. ONION THRIPS (*Thrips tabaci*) were normally abundant. CORN EARWORM (*Heliothis armigera*) on the whole, caused less damage than in 1953. WHITE GRUBS were normally abundant. STRIPED CUCUMBER BEETLES (*Acalymma vittata*) were rather late in appearing - very abundant locally in some fields.

Forest, Shade and Ornamental Pests

VIBURNUM APHID (*Anuraphis viburniphila*) eggs were hatching by 3rd week of April. Very abundant on ornamentals such as snowball. On untreated shrubs every terminal was curled and distorted. TENT CATERPILLARS were very general - abundant in some localities. MITES were generally abundant. Attack much heavier where DDT had been applied. BIRCH LEAF MINER (*Fenusa pusilla*) was normally abundant. ELM LEAF BEETLE (*Galerucella xanthomelaena*) was locally very abundant, especially in eastern Massachusetts. Not quite as abundant in western area. FALL WEBWORM (*Hyphantria cunea*) attack was much lighter than for last few years. A LINDEN MITE (Eotetranychus tiliarum) was quite abundant on bigleaf linden (Tilia platyphyllos) at Amherst. Specimens were determined by E. W. Baker, who reports this is the first record of this mite in the United States.

General Pests
ROSE CHAFER (Macrodactylus subspinosus) was about normal generally. JAPANESE BEETLE (Popillia japonica) - First beetles collected at Amherst June 20. Numbers built up slowly. Proved abundant along margin of spread. Less abundant in older sections. Generally more abundant in eastern Massachusetts than in western area. VARIEGATED CUTWORM (Peridroma margaritosa) averaged 80 per square foot on alfalfa in one field in eastern area. Also found in large numbers in a commercial greenhouse near Amherst. Infestation promptly and completely halted by insecticide applied ahead of the injured areas. Moths from this infestation identified as the above species. EUROPEAN EARWIG (Forficula auricularia) spreading northward and westward. Found in Essex County and spreading westward into central Massachusetts. Isolated center of infestation in Berkshire County. ARMYWORM (Pseudaletia unipuncta) was perhaps the outstanding pest in the State during late July. At least the most conspicuous and the one to seize publicity. Swept through large acreages in many points in eastern Massachusetts, especially Plymouth, Essex and Bristol Counties. Severe damage locally elsewhere. There was evidence of heavy parasitism and a considerable amount of wilt disease.

SUMMARY OF INSECT CONDITIONS-1954

WASHINGTON

Reported by C. A. Johansen
and D. H. Brannon

Tree Fruit Insects
APPLE APHID (Aphis pomi) populations built up in several areas late in the season. ORIENTAL FRUIT MOTH (Grapholitha molesta) evidently has not spread beyond the limited area of the Yakima Valley in which it was discovered in 1948 (see Yothers, CEIR 4 (40): 904). PEACH SILVER MITE (Vasates cornutus) found on Lodi apple, as well as peach, in the Wenatchee area. A CHERRY RUST MITE (Vasates fockeui) was abundant on cherry in the Wenatchee area. A PANDEMIS MOTH (Pandemis albaniana) on apricots and APPLE AND THORN SKELETONIZER (Anthophila pariana) on apple were abundant and damaging in localized areas of poor control.

Damaging infestation of A RAIN BEETLE (Pleocoma minor) found for the first time on the roots of apples in southwestern Washington. (Also see Newcomer, CEIR 4(48): 1054).

Small Fruit Insects

STRAWBERRY ROOT WEEVILS (Brachyrhinus ovatus and B. sulcatus) were abundant and damaging to strawberry and many other crops in western Washington and areas of eastern Washington. STRAWBERRY CROWN MOTH (Ramosia bibionipennis) caused serious damage to some plantings in southwestern Washington. MEADOW SPITTLEBUG (Philaenus leucophthalmus) was more serious than usual in several southwestern counties. CYCLAMEN MITE (Tarsonemus pallidus) was injurious to strawberries in western Washington. RASPBERRY ROOT BORER (Bembicia marginata) damaged raspberries in localized areas. ROSE LEAFHOPPER (Typhlocyba rosae) was abundant on blackberry and other berries in the Puyallup Valley during late season. GRAPE MEALYBUG (Pseudococcus maritimus) caused injury to grapes in the lower Yakima Valley, but less damage than during 1953 because of improved control measures. BLACK-HEADED FIRE-WORM (Rhopobota naevana) and CRANBERRY FRUITWORM (Mineola vaccinii) caused damage to some bogs in Pacific and Grays Harbor Counties. EUROPEAN FRUIT LECANIUM (Lecanium corni) is building up in several cranberry bogs.

Vegetable Crop Insects

PEA APHID (Macrosiphum pisi) damage to peas in the Walla Walla area was more severe and extensive than previously observed. Virus diseases, especially enation mosaic, increased the injury caused by this aphid (see Cook and Coffey, CEIR 4(29):660). There was one of the most serious infestations in the Palouse area in recent years. TUBER FLEA BEETLE (Epitrix tuberis) emergence occurred later than usual (started second week in May) in Yakima Valley and populations remained low during June. ASPARAGUS BEETLES (Crioceris asparagi and C. duodecimpunctata) populations were also unusually low during May and June. GREEN PEACH APHID (Myzus persicae) migrated from peach about May 1 in the Yakima Valley, peak of population on early crop potatoes during last week of June (lower than usual); local populations of "apparently resistant" aphids on potatoes in the Yakima Valley and on peaches in the Wenatchee area were present again this year. SEED-CORN MAGGOT (Hylemya cilicrura) damaged spinach in Walla Walla area during May. ONION MAGGOT (Hylemya antiqua) was abundant in some fields of the Walla Walla area during August and September. RED-BACKED CUTWORM (Euxoa ochrogaster) caused considerable damage to asparagus in the Yakima Valley during May. CABBAGE APHID (Brevicoryne brassicae) populations lower than normal on cole crops in western Washington. Moderate to heavy BEAN APHID (Aphis fabae) infestations developed on beans, spinach, and cucurbits in western area. GARDEN CENTIPEDE (*Scutigerella immaculata*) is now known to occur in seven Washington counties. It has become a pest of major concern on vegetable crops, field crops, and small fruits. (see Howitt and Waterhouse, CEIR 5(1):4). SLUGS (*Agriolimax agrestis*, *Arion ater*, and *Prophysaon andersoni*) were extremely heavy and damaging to pole beans, strawberries, ornamentals, and rhubarb in western Washington.

Field and Forage Crop Insects

RED-BACKED CUTWORM was abundant and damaging to sugar beets during May, defoliating alfalfa during April and May. LYGUS BUGS (*Lygus elisus*, *L. hesperus*, and *L. desertus*) were, as usual, the most important pest of alfalfa grown for seed. First nymphs collected during third week of May, "hard-to-kill" populations present again in some areas of the Yakima Valley. CLOVER APHID (*Anuraphis bakeri*) was abundant and difficult to control on red clover in the Columbia Basin. CLOVER LEAF WEEVIL (*Hypera punctata*) and CLOVER ROOT CURCULIO (*Sitona hispidula*) were moderate in southeastern Washington throughout the season. SWEETCLOVER WEEVIL (*Sitona cylindricollis*) caused complete loss of a sweetclover field near Cheney during May, found in nine counties of eastern Washington (see Bry, CEIR 4(48): 1042). A TIMOTHY MITE (*Paratetranychus pratensis*)was abundant on bluegrass in the lower Yakima Valley and crested wheatgrass near Lind during April and May. A SOD WEBWORM (*Crambus* sp.) was found near Spokane in Ocotber, causing extensive damage to creeping red fescue and Merion bluegrass seed fields. MORMON CRICKET (*Anabrus simplex*) populations were extremely low. GRASSHOPPER populations were generally low except for local buildups in Okanogan and Walla Walla Counties.

Small Grain Insects

BROWN WHEAT MITE (*Petrobia latens*) infestations were light on wheat in Lind area during May and June; abundant on wheat in Horseheaven Hills during June. ENGLISH GRAIN APHID (*Macrosiphum granarium*) was only light on wheat and barley, except for heavy local populations in Walla Walla area; heavily parasitized by *Aphidius obscuripes* in some locations. A WHEAT STEM MAGGOT (prob. *Meromyza pratorum*) caused moderate damage to wheat near Walla Walla. A GRASS BUG (*Thyrillus pacificus*) severely damaged a limited amount of wheat near Pomeroy. GREAT BASIN WIREWORM (*Ctenicera pruinina noxia*) caused injury to winter wheat in the Lind area during April.

Stored Grain Insects

RED FLOUR BEETLE (*Tribolium castaneum*) and SAW-TOOTHED GRAIN BEETLE (*Oryzaephilus surinamensis*) were the most common species again this year. Insects not abundant in most elevators, but several had heavy populations (see Walker and Bry, CEIR 5(3):48).

Ornamentals and Florist Crop Insects

CYCLAMEN MITE damaged greenhouse florist crops in the Puget Sound area. SOFT SCALE (*Coccus hesperidum*) caused injury to camellias and roses in several areas. GROUND MEALYBUG (*Rhizoecus falcifer*) was noted for first time damaging potted greenhouse plants in Pullman area. LESSER BULB FLY (*Eumerus tuberculatus*) was noted in bulb crops in Palouse, Walla Walla, and Puyallup areas, but considered to be a secondary pest. A FRIT FLY (probably *Oscinis* sp.) completely ruined a turf field near Seattle by late season. ELM LEAF BEETLE (*Galerucella xanthomelaena*) skeletonized elm foliage in Yakima Valley during June and July. TENT CATERPILLARS (*Malacosoma pluviale* and *M. disstria*) were extremely abundant and defoliated trees in western Washington. NORWAY MAPLE APHID (*Periphyllus lyropictus*) was numerous and annoying in many areas.

Household Pests

BROWN-BANDED ROACH (*Supella supellectilium*) is becoming established in the Pullman area, central Washington, and western Washington.

Bee Poisoning and Pollination

There was less damage from HONEY BEE (*Apis mellifera*) poisoning in tree fruit area of north central Washington in 1954 than in any of the previous 3 years. Two instances of severe poisoning noted in which holding yards were adjacent to orchards (Bartram). For the first time, pollination was a limiting factor for alfalfa seed production in a considerable part of the Brownstown-Harrah area. An ALKALI BEE (*Nomia melanderi*) populations were low because of cold weather, bird predators, and bee poisoning. (Menke).

Livestock Pests

CATTLE GRUBS (*Hypoderma lineatum* & *H. bovis*) and LICE (*Haematopinus eurysternus* and *Linognathus vituli*) populations were about normal. HORN FLY (*Siphona irritans*) and other flies were less than usual.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL BRANCH
ECONOMIC INSECT SURVEY SECTION

COOPERATIVE ECONOMIC INSECT REPORT

ARMYWORM OUTBREAKS IN UNITED STATES-1954*

The armyworm (Pseudaletia unipuncta) outbreaks of 1953 caused heavy losses in many states - nearly 9 million dollars in Kentucky alone. The destructive populations, however, occurred mostly in the area east of the Mississippi River. Again in 1954 serious populations were recorded extensively in this area and, in addition, destructive populations or severe outbreaks appeared in several Midwestern, North Central and Western States. (see map).

In States having the armyworm problem in both 1953 and 1954 there was considerable variance in infestations. The outbreaks of 1954 were more widespread or serious in Mississippi and Arkansas than the previous year as was the case in Maine where moth migration may have been responsible. In Missouri the uniformly widespread infestation could have been due to a considerably greater acreage of barley. Wisconsin, Rhode Island and New York also had heavier numbers. Populations were about the same as in 1953 in Louisiana, Virginia, and Illinois, but possibly more serious in Iowa where little trouble was experienced in 1953. Infestations, on the other hand, were much smaller in Connecticut and Delaware, and generally less severe in Indiana but definitely more damaging in the northwestern part of the latter State. Armyworm infestations were relatively lighter, about one-fourth as great, in Kentucky and much lighter in Maryland, South Carolina and Ohio, but heavier than average in the latter State. The insect was more widespread in Michigan, but less severe in affected areas than in 1953. Although Kansas had only spotted infestations in 1953, the 1954 outbreak was the most serious in several years. This was probably due to heavy moth flights into the State.

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*This report has been compiled from special information supplied principally through Clearing Offices in each of the 48 States.

Many states outside the general area of infestation in 1953 reported destructive outbreaks in 1954. Vermont had its first attack since 1938 and New Hampshire recorded spotted infestations in all counties. Large flights of moths into Minnesota and favorable weather conditions provided a serious situation in that State. Large populations appeared in Nebraska, probably due to earlier than usual arrival of moths. The population in North Dakota was the highest in many years. Heavy moth dispersal during June and favorable conditions are believed responsible. The damaging infestations in South Dakota were also due to moth flights. Higher than average temperatures in the irrigated areas may have been responsible for the build-up in New Mexico. Infestations of considerable importance were also reported in 1954 from Wyoming, Montana and Colorado.

Plants Attacked

Of the many kinds of plants listed as being attacked by the armyworm, the most frequently mentioned by most of the States were oats, corn , wheat, barley, alfalfa, rye and timothy. Some of the other hosts included grasses (Bermuda, orchard, blue, brome, Sudan, Johnson , fescue),grain sorghum, flax, millet, rice, sugar beets, mint, and clover.

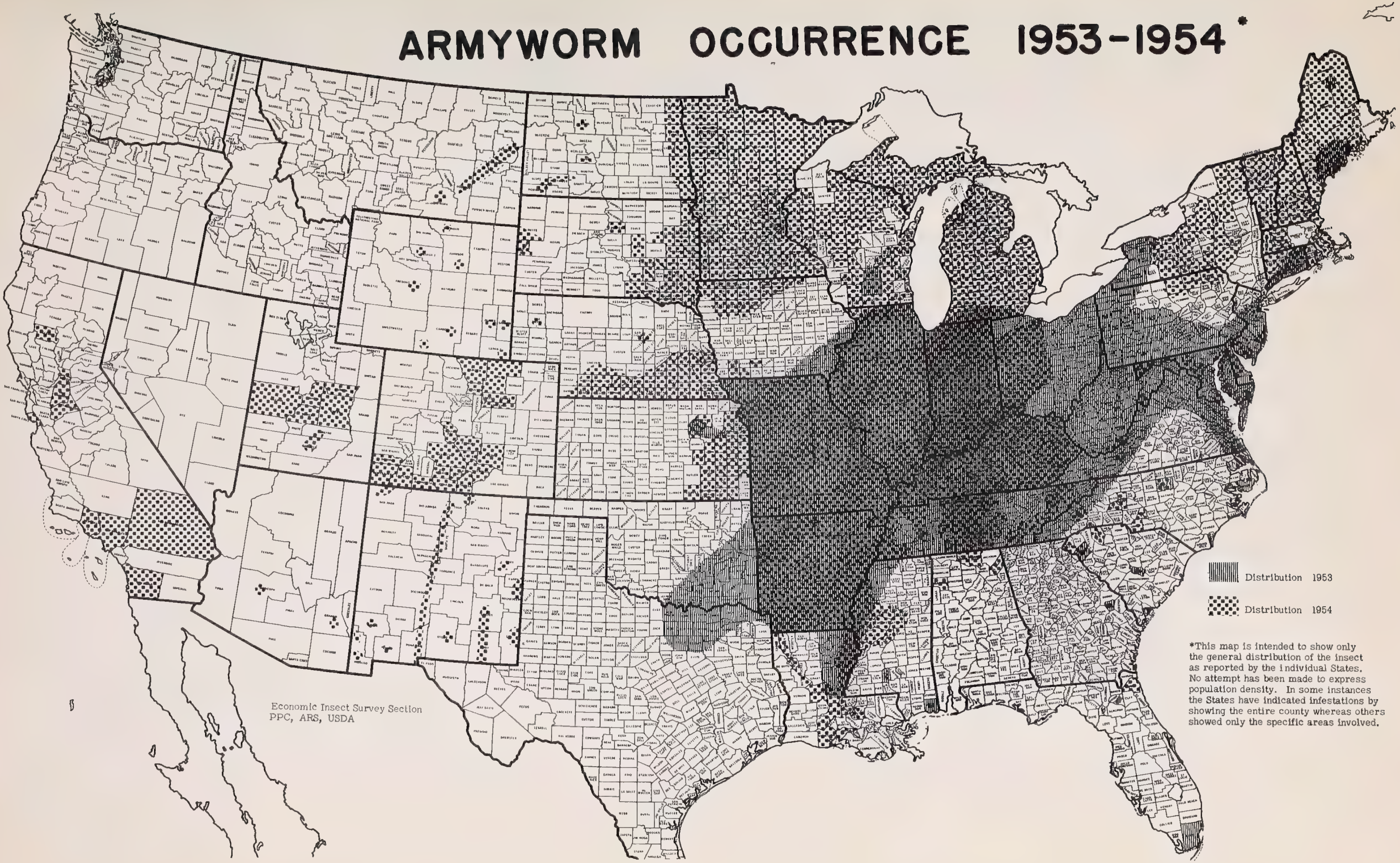
Origin of Infestations

Several States, including Louisiana, Florida, Virginia, Maryland, Pennsylvania and New Mexico attribute infestations to local sources; while Kentucky, Tennessee and Delaware infestations were reported due to factors both within and outside the States. Missouri had a small carryover in the southern area, but most of the trouble came from moth flights from outside. The third-generation outbreak in late August in this State was of local origin. In Indiana, it is believed that there were isolated areas in which the insects lived over and these gave rise to later populations. The majority of the States, especially the more northern, indicate that infestations arose from moth migration into their territories from outside areas. Illinois, Iowa, Kansas, Michigan, Wisconsin, Minnesota, Nebraska, South Dakota and Wyoming are included in this category.

Conditions responsible for development of infestations

According to the questionnaires, weather was listed as the factor responsible for development of infestations in most cases. Unusually mild and dry conditions and rank growth of vegetation during early spring are believed responsible in Arkansas. The South Carolina infestations appeared in lush grain, earliest in barley. Dry fall, mild winter, and cool wet spring were contributing factors in Tennessee while Kentucky had an early dry spring with rainy cold May which prolonged hatching. Virginia attributes its problem to a heavy carryover and mild winter. Pennsylvania, Delaware,

ARMYWORM OCCURRENCE 1953-1954*



*This map is intended to show only the general distribution of the insect as reported by the individual States. No attempt has been made to express population density. In some instances the States have indicated infestations by showing the entire county whereas others showed only the specific areas involved.

Economic Insect Survey Section
PPC, ARS, USDA

Massachusetts, and Rhode Island list cool moist weather as possible causes. Low temperature which reduced activity of parasites and predators contributed to development of infestations in Indiana, Illinois, and Missouri. This condition also promoted growth of grass crops in Illinois. The armyworm conditions in Iowa were possibly due to the character of winter and spring weather while unusually early warm days in February and March in Kansas apparently hastened moth flight into the State. High winds and rains at peak outbreak hampered aerial spray applications in this State. Winds were listed as contributing factors in Wisconsin, Minnesota and North Dakota. In early June a severe windstorm moved northward through western and central Minnesota and eastern North Dakota with rainy weather prevailing throughout the month. Michigan indicated moist conditions together with lodging of grain while South Dakota had heaviest infestations of the pest in rank or lodged grain. Weather was favorable to egg-hatching in Wyoming and infestations came after start of summer rains in Arizona.

Factors responsible for termination of outbreaks
Various factors, including natural enemies, control measures and weather, were reported as responsible for the termination of the armyworm outbreaks. Weather retarded the first-generation larval development in Arkansas and insecticidal control was widely used. Parasitism and predatism, however, were only minor factors. Cessation of activity in Louisiana was attributed to control measures. Oviposition was interrupted by cold weather in Kentucky while protracted cold weather in May retarded larval development in Tennessee so that parasites became effective. South Carolina, North Carolina, and Virginia, which had spotted infestations, attribute termination of armyworm activity to chemical and natural controls. Natural enemies were probably responsible for controlling or terminating the relatively minor infestations in West Virginia and New Jersey. As in South Carolina and Virginia, parasitism was very high in Pennsylvania, though spraying and pupation were also listed. Tachina flies were apparently chiefly responsible in Connecticut. New York lists parasites as the important factor with control measures playing little part while Maine and Massachusetts attribute termination to chemical control and natural enemies. Cool weather and natural enemies were primary controlling factors in Vermont.

Tachina parasites were more abundant in Ohio than in 1953 and a fungus disease was also abundant late in the outbreak. Appearance of parasites halted the outbreak in Indiana although control measures saved thousands of acres of crops. Parasites and a disease were in evidence in Illinois. Control measures and maturity of larvae also helped terminate the infestation in this State. Chemical control was largely responsible for ending the first generation in southern two-thirds of Missouri while parasites were primarily responsible in the rest of the State. The third generation in Missouri was largely controlled by parasites although considerable insecticides were used. Dry weather was effective in Michigan and biological and chemical control in Wisconsin. Minnesota listed widespread use of insecticides together with grain maturity and drying. Spraying had little effect in termination of the problem in North Dakota, but heat and drought forced pupation in the southwest area. Hot dry weather was the dominant factor also in South Dakota. Iowa listed weather, parasites and chemical control while Nebraska attributed termination of infestations to tachina parasites and weather. Parasitic Diptera and Hymenoptera along with insecticides aided in the alleviation of the problem in Kansas. The outbreaks in Wyoming and Montana ended with pupation, although some controls were used. Chemical controls were credited with terminating the infestations in Colorado and Utah while pupation and control were the important factors in New Mexico.

Insecticides

Replies to the questionnaire relative to information on insecticides were somewhat incomplete. Briefly, the following comments have been summarized from the reports made by 33 States.

Insecticides used included toxaphene, DDT, dieldrin, chlordane, aldrin, parathion, heptachlor, endrin, methoxychlor, malathion, BHC (lindane concentrate) and paris green. The materials were mixed from basic dusts, emulsion concentrates and wettable powders. Rates of application per acre were in line with state recommendations for the various materials.

The materials were applied by both aerial and ground equipment. Reports indicated aerial application exceeded by more than 2 to 1 any other method throughout many of the heavily infested areas. In Illinois 44 percent of the treated acreage was applied by planes while farmers and commercial operators applied 43 percent and 13 percent respectively with ground equipment. As is frequently the case during emergency outbreaks, there was an indication that commercial operators made applications, in many states, where they were not needed or were too late to do much good. The cost of aerial applications, exclusive of insecticides, ranged from 75¢ to $4.00 and averaged approximately $1.45. Ground application costs ranged from 25¢ to 75¢ and averaged 50¢. In a majority of cases the farmer furnished the material for use of the applicator. Depending upon the material used, the combination costs of material and application ranged from $2.00 to $5.00.

A review of some 65 reports on the materials used indicated that they were all effective within the range of good control. Failures resulted primarily from inadequate application and the lack of good advice relative to the stage of development of the insect . Numerous reports indicated that farmers applying insecticides during the late stages in the development of the armyworms did not receive much better protection that those who did not apply controls. Controls applied to small larvae were generally effective except where low dosages were used on areas heavily covered with vegetation.

Other comments
ARKANSAS - First generation always responsible for economic losses in Arkansas. Development of this generation retarded by weather in late April and early May. ILLINOIS - Of 170,125 acres treated, 20 percent treated too late and five percent unnecessarily. KENTUCKY - In alfalfa, armyworm occurred concomitantly with outbreaks of variegated cutworm which comprised probably 75 percent of the populations. LOUISIANA - Effective control programs following warnings by county agents in critical areas were effective in keeping crop losses to minimum. MARYLAND - Outbreak in Garrett County last of July unusually late. This indicated a second generation or possible origin from moth flights. A parasite, probably Winthemia quadripustulata, was abundant. MASSACHUSETTS - Some means of forecasting needed. When farmers noted or reported outbreak, larvae nearly mature and damage done. MICHIGAN - Application of insecticides was the deciding factor. MISSOURI - Sporadic moth flight continued in varying numbers until about the middle of November. A few third-instar larvae were recovered from samples of bunch grass collected in chinch bug survey. NORTH DAKOTA - The armyworm situation is difficult to evaluate, but surveys and inquiries revealed that: (1) Crop damage was evident in only a few fields in northeastern counties, (2) Farmers' fear of losses and some misinformation from commercial control operators resulted in the hurried and untimely treatment of fields with low populations, especially since there was no established formula for determining when control measures were necessary, (3) Treated and untreated fields showed about equal damage. RHODE ISLAND - Some populations were nearly 100 percent parasitized. SOUTH CAROLINA - Surveys need to be expanded and continued. WISCONSIN - Many county agents reported unfavorable radio publicity. County agents also indicated some pest control operators were unethical. Some reported that armyworm concern interferred with grasshopper and forage insect control. CALIFORNIA - Pseudaletia unipuncta is widespread over California but is seldom of major crop importance.

Crop losses from armyworm and savings by control shown in table 1.

Crop losses from armyworm damage and savings resulting from control:

Table 1

State	Crop	Estimated Loss		Estimated No. Acres Treated	Estimated Savings	
		Acres, Bushels, etc.	Dollar Value		Acres, Bushels, etc.	Dollar Value
ARKANSAS	Oats	Nominal		175,000	1,000,000 bu.	$800,000
	Wheat	Nominal		20,000	100,000 bu.	200,000
	Barley	Nominal		2,000	2,500 bu.	13,750
DELAWARE	Rye	40-50 acres (marginal)		?		
	Wheat	75-100 acres (total marginal)		?		
	Barley	100 acres (marginal)		?		
ILLINOIS	Wheat		$180,000	84,737		$2,235,950
	Grass		170,000	85,388		1,724,585
INDIANA	Grass		$300,000			$1,500,000
	Wheat & other small grains		300,000			1,500,000
	Corn		400,000			2,000,000
KANSAS	Barley	382,300 bu.	$475,000	23,155	463,100 bu.	$578,875
	Wheat	200,000 bu.	400,000	31,000	124,000 bu.	248,000
	Grassland (brome)	51,000 acres	51,000	7,500	7,500 acres	7,500
	Other					240,000
KENTUCKY	Barley	(Loss at $10 per acre)	$425,000	42,500	(Gain at $7 per acre)	$297,500
	Wheat		375,000	37,500		262,500
	Alfalfa		375,000	37,500		262,500
	Oats		75,000	7,500		52,500
LOUISIANA	Oats	Very minor	Small	Unavailable but large		Great
	Rice					
	Wheat					
	Grasses					
	Cane					
MAINE	Small grain (oats)	500 acres	$25,000	1,500	1,000 acres	$25,000
MARYLAND	Barley	1,300 bu.		500		
	Wheat	500 bu.		500		
	Corn	100 acres		1,000		
MASSACHUSETTS	Grass	200 acres		100	Application too late.	
MICHIGAN	Oats	500 acres	$15,000	3,000		$50,000
MINNESOTA	Barley	3,466,000 bu.	$3,569,980	1,186,500 (all small grains)	7,963,000 bu.	$8,201,890
	Oats	7,255,000 bu.	4,570,650		15,495,000 bu.	9,761,850
	Wheat	963,000 bu.	2,070,450		4,697,000 bu.	10,098,550
	Corn	1,296,000 bu.	1,788,480		8,228,000 bu.	11,354,640
MISSOURI	Barley (6%)	420,000 bu.	$ 432,600	112,500	1,687,500 bu.	$1,738,125
	Rye (2.5%)	25,500 bu.	29,325	9,000	81,000 bu.	93,150
	Wheat (1.5%)	601,710 bu.	1,233,505	90,500	1,811,600 bu.	3,713,780
	Oats (1%)	598,430 bu.	436,854	57,680	1,442,000 bu.	1,052,660
	Fescue	150,000 bu.	23,250	3,000	600,000 lbs. (seed)	93,000
	Bluegrass & other pasture	2,000 lbs. (seed)	100,000	40,000	5,000 lbs. (seed)	200,000
	Alfalfa	200 tons	5,000	1,000	1,000 tons	25,000
MONTANA	Wheat, oats	Little damage by defoliation--late in season. Normal or above yields harvested.				
	Corn	Control measures were taken on a small acreage of experimental corn.				
	Beets	Probably 200-300 acres attacked. Control measures applied. Some doubt whether treatment was practical. Larvae in last instar and would probably have stopped feeding anyway.				

Crop losses from armyworm damage and savings resulting from control:

Table 1 (Cont'd)

State	Crop	Estimated Loss		Estimated No. Acres Treated	Estimated Savings	
		Acres, Bushels, etc.	Dollar Value		Acres, Bushels, etc.	Dollar Value
NEBRASKA	Pasture	5,000 acres	$50,000	1,000		$10,000
	Alfalfa	1,200 acres	60,000	300		15,000
	Corn	Minor	Minor	None		
NEW MEXICO				20,000		
NORTH CAROLINA	Grain	It is very difficult to arrive at a figure since the worms usually fed upon the leaves and did not cut the heads of grain. There was a loss in many of the small-grain fields to young clover or other legumes. A rough estimate which seems probable might be $10 per acre on 2,000 acres.				
NORTH DAKOTA	Barley	Although armyworm infestation was widespread, only a few fields reveal crop damage from the pest. Infestation in many fields was restricted to lodged grain which could not be recovered during harvest. Infestation in southwest North Dakota was restricted to hailed area where farmers had claimed 100% loss from hail.		80,000	Chemical control aided very little in reducing crop damage by armyworms. Applications were applied when worms had nearly reached maturity. Control was effective only in thin stands of grain.	
	Oats			20,000		
	Wheat			25,000		
	Flax			500		
	Corn			200		
PENNSYLVANIA	Oats	About 2-1/2 percent loss in area infested		1,000	Saved about 60 percent	
SOUTH CAROLINA	Oats	1,500	$15,000	1,500		$15,000
SOUTH DAKOTA	Small grain & corn		$190,000	13,000		$130,000
TENNESSEE	All	64,000 acres	$960,000	100,000 acres		$1,500,000
UTAH			$160,000			$100,000
VERMONT	Hay (includes 1st & 2d crops)	1,300 acres	$42,000			
	Corn silage	150 acres	9,600			
	Oats	350 acres	7,900			
	Sudan & Hungarian millet	75 acres	4,800			
	Alfalfa	50+ acres dmg.				
VIRGINIA	Barley	263,512 bu.	$268,782		30-40 percent saving on treated crops	
	Oats	474,558 bu.	379,646			
	Wheat	140,727 bu.	126,654			
	Corn	751,575 bu.	1,322,772			
	Rye	20,465 bu.	28,037			
WISCONSIN	Corn			51,205		
	Oats (other small grains)					
	New seedings					
WYOMING	Barley	4,300 acres	$28,500	2,943	900 acres	$4,845
	Oats	12,337 acres	33,600	8,745	41,579 acres	19,370
	Alfalfa	40 acres	1,750	40	30 acres	750
	Grass	100 acres	1,500	20	(Saved armyworms from spreading).	
	Hay crops	2,500 acres	9,500	700	300 acres	1,944

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